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AN ANALYSIS OF A TIMBER HARVESTING OPERATIONS IMPACT AND EFFECTS ON A BASALT LITHIC SCATTER IN N.E. OREGON: A SYNOPSIS

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ABSTRACT

At present there is no way of assessing the magnitude of disturbance of timber harvesting operations on an archaeological site. Because there are many different methods of harvesting timber and probably an equal number of types of archaeological sites the study focuses on one method in one area on one type of site. The study was initiated because the author feels that one goal of cultural resource management is the resolution of conflicts between archaeology and other resources on federally administered lands. Those who are involved in clutural resource management are responsible for the development of a range of conflict resolution strategies. These strategies should have the following objectives: 1) minimizing damage to the resource; 2) banking of specific sites; 3) maximizing archaeological research use where #1 or #2 are not feasible (Wildesen, 1978.) The study centers on objective #1, minimizing damage to the resource.

INTRODUCTION

The study originated as a result of a suggestion by Dr. Jack Witherspoon, Oregon State BLM Archaeologist, that a heavily distrubed basalt lithic scatter could contribute data on what effects a timber sale may generate in an archaeological site. It was soon discovered that Mr. Glenn Hartmann, presently of Central Washington State University, Ellensburg, Washington, had written a research proposal concerning timber sale effects on archaeological sites (Hartmann 1977.) This research proposal was slightly modified for use in the situation at hand in Baker County, Oregon. Dr. Leslie Wildesen had written a paper concerning effects of a theoretical timber sale on an archaeological sites values (Wildesen 1978.) Her definitions of impact and effect

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are used in this study. Her ideas concerning the range of values a site may contain are also used. The only archaeologist who has done work concerning effects of a timber sale on a site is Mr. Joseph Gallagher (Gallagher 1977.) He conducted studies on slash treatment effects of a site he manufactured for this study. Presently, Dr. Wildesen is doing a comprehensive study on the effects of various yarding and hauling techniques on archaeological sites in various forest environments. A review of the libraries of the Departments of Interior and Agriculture failed to reveal any other sources of information concerning this topic. Letters to various professionals in and out of government failed to elicit any sources other than the investigators previously mentioned.

Because of the length and detailed nature of the study only a synopsis of the results can be given in this paper.

PHYSICAL SETTING

Site 35-BA-81 is a basalt lithic scatter located in a small stringer of ponderosa timber about seven miles north of the Powder River in northern Baker County. The site occupies elevations ranging from 4,320 to 4,491 feet on a south facing slope.

The timber occupies the interior slopes of Slide Creek Draw which is a minor intermittent tributary of Balm Creek. This creek is a perennial stream which is a major drainage of the foothills of the Wallowa Mountains. The geography is a heavily eroded section of the Columbia River lavas which covered an undulating prelava surface.

The site is a series of concentrations of basalt, obsidian and cryptocrystalline materials in a broad scatter that covers approximately 40 acres. The heaviest concentrations exist within the fingers of timber on the east and west margins of Slide Creek.

The site's assemblage presently consists of percussion struck flakes removed from: 1) irregularly struck cores of basalt; 2) manufacturing debris of stone tools; and 3) natural pieces of basalt slightly modified by/for use.

Much of the site had been disturbed by previous timber harvesting activities and grazing. These activities have resulted in an open canopy with a light grass and forb cover in the main grazing area and underbrush in areas which is not grazed.

METHODOLOGY

It was the goal of the study to document the impact a specific action caused on a locus of activity and interpret the effect(s) of that impact. The loci were photographed and described before the harvest activities began. The harvesting activities were photographed and analyzed. The analysis was oriented toward vertical and horizontal displacement, soil compaction disturbance and artifact/flake modification. Pseudo-artifacts, flakes and natural materials whose shapes and sizes were analogous to artifacts found in the area but not present in the site were used to postulate effects of an action on a particular class of artifact.

Sale activities were divided into three classes. These are: 1) preharvest which includes cruising and marking, 2) harvest phase which includes falling, limbing, bucking, skidding and decking, 3) post harvest phase which is composed of slash disposal, site rehabilitation and road repair. These divisions are based on what the author considered to be related actions.

The studies basic philosophy focused on the following points: 1) A sites internal spatial patterning reflacts past activities as modified by later cultural and natural actions. These actions may leave evidence of their occurence on the sites contents and configuration. 2) Archaeological

studies are dependent upon a site's cultural and natural integrity. 3) A site's internal order reflects past decisions on what is appropriate behavior and organization by an extant social system. A site is an expression of that extant social system's structure, as the site in question relates to other sites in a region, i.e. it is one site out of many that reflects the seasonal utilization pattern of an aboriginal group. Effect was determined by interpreting the alteration of a locus that an action generated.

Impact and effect are defined utilizing Wildesen's definitions. An impact is defined as a "measurable change in the present nature of a characteristic of a site." Effect is "an interpretation of that change as it relates to identified archaeological values."

The value of a site, whether aboriginal or historic are considered to be: aesthethic, interpretive, recreational, economic and scientific. This synopsis is concerned only with the effects of the harvesting actions on the scientific values of the site.

The first benefit noted by presale activities is an increase in the inventories of cultural properties on a district. This benefit has occurred from the para-archaeological training that they have received.

A review of pertinent cultural resource literature reveals that collection may result in the following effects: 1) culturally diagnostic materials would be removed, 2) materials essential to the identification of tasks would be removed, 3) steps in the manufacturing trajectory would be removed, 4) evidence for past cultural and natural disturbance would be altered, 5) creation of new artifact distributions by selective removal of materials in open areas of a site.

These impacts would have the effects of eliminating or reducing the materials needed to determine the chronological placement of a site, cultural affiliations, trade and economic relations of the locality and region,

behavior and organization systems in the site as well as intersite relationships. Collection is severe in its effect and permanent in its duration.

The loss of a site's internal spatial relationships, vertical as well as horizontal is greatest when a log(s) is moved from the site where it was cut to the area where it is tored before shipment to the mill (skidding.) These storage areas are called decks. At a deck a cat or similar device piles the log left by a tracked or rubber tired vehicle. The deck area is kept clear of debris by use of a cat.

Skidding of a log, particularly on a slope generates several phenomena which negatively impacts a lithic scatter. The angle at which the front end of a log is a major determinant of the depth and width of the trail left by that log's passage. When the log(s) are towed with the front end (the end nearest the cat) this acts in a manner similar to a plow. The sediments, duff and debris are rolled to the side of the log leaving a ridge of materials that is parallel to the furrow left by the log's passage. In an ash/basalt soil, artifacts and flakes were not physically altered. However, vertical and horizontal displacement occured. In rocky soils, slight alteration of a flake's platform area occured. Presummably the alteration occured as the flake was ground while fine sidements and changes in rock size were displaced by the log's passage.

A log which was transported down a 30% slope and across a slope of about 10% created deep furrows on the lower edge of the slope. A burm of thoroughly mixed ash/basalt soil is generated. During each passage, the log digs deeper into the base of the burm mixing new sediments into previously mixed sediments. Artifacts, flakes and debris are thoroughly mixed together. Where the soil is rocky in composition, a linear alignment of heavily battered rocks occurs on the lower edge of the skid trail. The

rocks in the bed of the trail are compacted into a pavement whose individual members exhibit battering.

Whether in low bulk density soil or rocky soil, artifacts are displaced and contextual relationships are altered or destroyed. Little physical modification of material occured in the ash/basalt soil.

A tracked vehicle when it turns whether on a slope or a level plain displaces soil and clutural material to the outer edge of the track on the outside of the turn. These displaced ridges of soil and debris and cultural material show that mixing has occured. Evidence for this is the random orientation of the flakes and debris in these alignments of materials. As the percentage of slope increases and bulk density of the soil decreases, the impact of turning increases. The amounts of materials vertically and horizontally displaced increases as slope increases and soil density decreases. In a rocky soil with a high percentage of ash and fine basaltic soil particles the same impact occurs. Rocks are ground against each other and displaced to the outside of the track. Artifacts in the "nonrocky" soil show little abrasion or breakage (including obsidian.) The cultural materials in a rocky soil show abrasion and breakage.

Each loci are differentially affected by skidding of a log through it. The factors generating the greatest amount of disruption of the locus spatial relationships are: 1) number of trips made through it, 2) whether the vehicle load turned or did not turn while moving through the locus, 3) percentage of slope (the greater the slope the greater the impact), 4) bulk density of the soil, 5) size and number of logs in a load, and 6) size, shape and material of the cultural material impacted in the action of skidding the logs. The less sphercity the greater the chance of breakage or scaring. It appears that spherical materials are displaced easier with less

modification than cultural materials which are less spherical in shape. Thus, grinding stones, metates, hopper mortar bases suffer the worst.

The action of piling slash; piling logs on a deck; and clearing of debris in a deck has their own impacts on a sites cultural content.

Slash is the organic residue left over from timber cutting. These residues are primarily composed of limbs removed from felled trees,logs or section of logs, broken up brush, small trees, etc. Slash was piled by hand and by cats with blades for the timber sale discussed in this paper. Piling by hand did not affect cultural materials in the site. The use of a blade disrupted the spatial relationships in and between activity loci. A cat pushing slash into a pile removed the ground cover of the soil. Thsi cover; surface artifacts; and slash were tumbled together in a grating mass of materials against the cat's blade. Smaller artifacts dropped out below and to the side of the blade before larger pieces did, i.e. flakes before cores. Artifacts and flakes examined did not exhibit abrasion or surface alteration. Cultural materials were displaced by the action. Or they were swept up by the cat and moved to the slash pile. Or they were dropped out before reaching the slash pile. The needle bundles were observed to sweep the soil surface bare of duff, small flakes and debris. As the needle bundle rotated while being moved, the soil and artifacts were displaced in a circular manner causing a mixing of materials.

Slash piling and piling of debris in a deck are felt to create new cultural material density patternings in a site. The area swept bare by the cat would have a lower density of cultural materials than before. The piles of debris would have greater density of cultural materials then before. The formal spatial attribute of a site would be destroyed as would be evidence for a site's post depositional history.

The action of piling logs on deck generated several interesting phenomena. The logs piled by the use of a blade exhibited a rolling spinning motion. Dirt, rocks and debris were rotated through these spinning logs. No cultural materials were observed to have been put through the ringer but it would be interesting to note the effect of the action on the physical form of various artifact classes.

The blade dug into the soil to move the log. The tracks slipped as they tried to maintain traction on the loosely consolidated soil. Several obsidian flakes were noted in the deeply disturbed sediments. No alteration occured but spatial relationships were totally destroyed. The heaviest impact being on a 30% slope where a small landing was located on the shoulder of a road by a creek. The decks on the river ridges and the block of material exhibited battering, flaking and breakage. Some of the flakes of basalt exhibited characteristics traditionally associated with human manufacturing activities.

CONCLUSION

Overall the primary effect of the harvesting action on the site was that of disrupting the spatial relationships on the site. Vertical displacement was greatest in deeper soils with low bulk density and fine particle size. Horizontal displacement was greatest in the primary skid trails, deck and slash piling activities. Form modification was greatest in the rocky soils and least in low density ash/basalt soils. Skidding impacts were controlled by the greatest number of variables: 1) angle of the log being skidded, 2) slope over which skidding has occurred, and 3) soil characteristics. Collection may be considered to be a major negative action in an archaeological site.

The following actions are felt necessary to alleviate the negative

effects briefly outlined in the synopsis: 1) Instruct field personnel of the value of cultural resources. This includes a site's scientific, educational, recreational and economic value. 2) Use of skid pans or trailers to load trees from the cutting site to deck. The may reduce surface disruption and compaction. 3) Trim limbs close to the trunk at the cutting site so they will not act as plows and extend the area of impact. 4) Keep the front end of the log out of the dirt. This will reduce furrowing. 5) Avoid turning on a slope. If this is not possible make wide shallow angle turns. 6) Avoid loosely compacted soils. 7) Do not haul up slope that is 30% or more using a tractor. 8) Chip and mulch slash across the site and sale area to stabilize soil.

BIBLIOGRAPHY

Gallagher, Joseph G.
1977 Scarification and Cultural Resources: An Experiment to Evaluate Alternate Management Direction. M.S. on file Sawtooth National Forest.

Hartmann, Glenn
1977 The Effects of Logging Operations on Archaeological Sites in Western Oregon. M.S. on file at Baker and Coos Bay District Offices.

Wildesen, Leslie
1978a Conserving Archaeological Values: An Approach to Resolving Land Use Conflicts in Archaeological Resource Management. M.S. file U.S.F.S., Portland, Oregon.

1978b Contract No. R6-78-3cl

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